

**CERTIFICATE OF MAILING**

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Case: Hagopian



**PATENT**

**Attorney Docket No. 2344-738**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Application	)	<u>PATENT APPLICATION</u>
Inventor(s): Sneh	)	
Application No.: 10/052,890	)	Art Unit: To Be Assigned
Filed: October 19, 2001	)	Examiner: Not Yet Assigned
Title Process For Tungsten Silicide Atomic Layer Deposition	)	

**INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §1.97**

Commissioner for Patents  
Washington, D.C. 20231

Sir:

Listed below or on an attached Form PTO-1449 is information known to applicant(s). A copy of each listed publication and U.S. and foreign patent, except for pending U.S. applications, is being submitted herewith, along with a concise explanation of information in a foreign language, if any, pursuant to 37 C.F.R. §1.97-1.98.

Applicants respectfully request that the listed information be considered by the Examiner and be made of record in the above-identified application. If form PTO-1449 is enclosed, the Examiner is requested to initial and return it in accordance with MPEP §609.

This statement is not intended to represent that a search has been made or that the information cited in the statement is, or is considered to be, material to patentability as defined in §1.56.

- ☐ This statement qualifies under 37 C.F.R. §1.97, subsection (b) because (check all that apply):
- ☐ (1) It is being filed within 3 months of the application filing date and is other than a continued prosecution application under § 1.53(d)  
-- OR --
  - ☐ (2) It is being filed within 3 months of entry of a national stage  
-- OR --
  - ☐ (3) It is being filed before the mail date of the first Office Action on the merits  
-- OR --
  - ☐ (4) It is being filed before the mailing of a first Office Action after the filing of a request for continued examination under § 1.114.

- ☐ 37 C.F.R. §1.97(c). If this statement is being filed after the latest of: (1) three months beyond the filing date of a national application; (2) three months beyond the date of entry of the national stage as set forth in §1.491 in an international application; or (3) the mailing date of a first Office action on the merits, but before the mailing date of the earlier of a final office action under §1.113 or a notice of allowance under §1.311, then:

- ☒ a certification as specified in §1.97(e) is provided below; **or**
- ☐ a fee of \$180.00 as set forth in §1.17(p) is authorized below, enclosed, or included with the payment of other papers filed together with this statement.

- ☐ 37 C.F.R. §1.97(d). If this statement is being filed after the mailing date of the earlier of a final office action under §1.113 or a notice of allowance under §1.311, but before payment of the issue fee, then:

- A. a certification as specified in §1.97(e) is completed below; and
- B. a petition under 37 C.F.R. §1.97(d) requesting consideration of this statement is submitted herewith; **and**
- C. a fee of \$130.00 as set forth in §1.17(i)(1) is authorized below, enclosed, or included with the payment of other papers filed together with this statement.

- ☒ **Fee Authorization.** The Commissioner is hereby authorized to charge the above-referenced fees of \$0.00 and charge any additional fees or credit any overpayment associated with this communication to Deposit Account No. 23-2415 (Docket No. 2344-738).

Respectfully submitted,

WILSON SONSINI GOODRICH & ROSATI

By: 

Paul Davis, Reg. No. 29,294

Dated: 4/1/02

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**CERTIFICATION**

*(Attachment to Information Disclosure Statement)*

- ☐ 37 C.F.R. §1.97(e)(1). **APPLICANT'S UNDERSIGNED ATTORNEY HEREBY CERTIFIES THAT** each item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the statement; or
- ☒ 37 C.F.R. §1.97(e)(2). **APPLICANT'S UNDERSIGNED ATTORNEY HEREBY CERTIFIES THAT** no item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application or, to the knowledge of the person signing this certification after making reasonable inquiry, was known to any individual designated in §1.56(c) more than three months prior to the filing of this statement.

Respectfully submitted,

Dated: \_\_\_\_\_

4/1/02

By: \_\_\_\_\_

Paul Davis, Reg. No. 29,294

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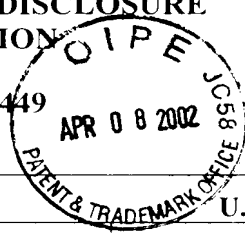
Customer No. 021971

<b>INFORMATION DISCLOSURE CITATION</b>  <b>PTO-1449</b>			ATTY. DOCKET NO. 2344-738		SERIAL NO. 10/052,890		
			APPLICANT Sneh				
			FILING DATE 10/19/01		GROUP To Be Assigned		
<b>U.S. PATENT DOCUMENTS</b>							
EXAMINER'S INITIALS	PATENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE	
	4,058,430	11/15/77	Suntola et al.	156	611		
	4,389,973	6/28/83	Suntola et al.	118	725		
	4,413,022	11/1/83	Suntola et al.	427	255.2		
	4,416,933	11/22/83	Antson et al.	428	216		
	4,533,410	8/6/85	Ogura et al.	148	175		
	4,533,820	8/6/85	Shimizu	219	411		
	4,689,247	8/25/87	Doty et al.	427	126.1		
	4,828,224	5/9/89	Crabb et al.	251	298		
	4,836,138	6/6/89	Robinson et al.	118	666		
<b>FOREIGN PATENT DOCUMENTS</b>							
EXAMINER'S INITIALS	PATENT NO.	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
						YES	NO
	0 442 490 A1	8/21/91	EP	C30B	25/02	<input type="checkbox"/>	<input type="checkbox"/>
	0 442 490 B1	8/21/91	EP	C30B	25/02	<input type="checkbox"/>	<input type="checkbox"/>
	0 511 264 B1	11/4/92	EP	B01J	37/02	<input type="checkbox"/>	<input type="checkbox"/>
	WO 91/10510	7/25/91	PCT	B01J	37/02	<input type="checkbox"/>	<input type="checkbox"/>
	60-10625	1/19/85	JP	H01L	21/302	<input type="checkbox"/>	<input type="checkbox"/>
<b>OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)</b>							
Bedair, S.M. et al., "Atomic Layer Epitaxy of III-V Binary Compounds", Appl. Phys. Lett. (1985) 47(1): 51-3							
Tischler, M.A. et al., "Growth and Characterization of Compound Semiconductors by Atomic Layer Epitaxy", J. Cryst. Growth (1986) 77: 89-94							
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O'Hanlon, J. "Gas Release From Solids", A Users Guide to Vacuum Technology (1989) Chap. 4: 56-71							
Watanabe, A. et al., "The Mechanism of Self-Limiting Growth of Atomic Layer Epitaxy of GaAs By Metalorganic Molecular Beam Epitaxy Using Trimethylgallium and Arsine", Jpn.J. of Appl. Phys. (1989) 28(7): L 1080-82							
EXAMINER			DATE CONSIDERED				

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EXAMINER'S INITIALS	PATENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE	
	4,846,102	7/11/89	Ozias	118	730		
	4,907,862	3/13/90	Suntola	350	345		
	4,913,929	4/3/90	Moslehi et al.	427	39		
	4,975,252	12/4/90	Nishizawa et al.	422	245		
	4,976,996	12/11/90	Monkowski et al.	427	255.5		
	4,933,360	2/19/91	Nakamura	118			
	5,000,113	3/19/91	Wang et al.	118	723		
	5,015,503	5/14/91	Varrin Jr. et al.	427	255.2		
	5,077,875	1/7/92	Hoke et al.	29	25.01		
<b>FOREIGN PATENT DOCUMENTS</b>							
EXAMINER'S INITIALS	PATENT NO.	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
						YES	NO
	2-152251	6/12/90	JP	H01L	21/68	<input type="checkbox"/>	<input type="checkbox"/>
	5-152215	6/18/93	JP	H01L	21/205	<input type="checkbox"/>	<input type="checkbox"/>
	8-236459	9/13/96	JP	H01L	21/205	<input type="checkbox"/>	<input type="checkbox"/>
	10-102256	4/21/98	JP	H01L	16/44	<input type="checkbox"/>	<input type="checkbox"/>
<b>OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)</b>							
Suntola, T. "Atomic Layer Epitaxy", Material Science Reports (1989) 4: 261-312							
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Sakaue, H. et al., "Digital Chemical Vapor Deposition of SiO <sub>2</sub> Using A Repetitive Reaction of Triethylsilane/ Hydrogen and Oxidation", Jpn. J. of Appl. Phys. (1990) 30(1B): L124-7							
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EXAMINER'S INITIALS	PATENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE
	5,078,851	1/7/92	Nishihata et al.	204	298.4	
	5,119,760	6/9/92	McMillan et al.	118	722	
	5,156,820	10/20/92	Wong et al.	422	186.05	
	5,194,401	3/16/93	Adams et al.	437	173	
	5,204,314	4/20/93	Kirlin et al.	505	1	
	5,270,247	12/14/93	Sakuma et al.	437	133	
	5,281,274	1/25/94	Yoder	118	697	
	5,294,778	3/15/94	Carman et al.	219	385	
	5,320,680	6/14/94	Learn et al.	118	724	
	5,336,327	8/9/94	Lee	118	730	
	5,484,484	1/16/96	Yamaga et al.	118	719	
	5,582,866	12/10/96	White	427	248.1	
	5,693,139	12/2/97	Nishizawa et al.	117	89	
<b>OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)</b>						
	Roth, A. "The Vacuum", Vacuum Technology (1990) Chap. 1: 1-7 and Chap. 2: 28-45					
	McDermott, B. et al., "Ordered GaInP by Atomic-Layer Epitaxy", J. Cryst. Growth (1991) 107(1-4): 96-101					
	Lubben, D. et al., "UV Photostimulated Si Atomic-Layer Epitaxy", Mat. Res. Soc. Symp. Proc. (1991) 222: 177-187					
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	Suntola, T. "Atomic Layer Epitaxy", Thin Solid Films (1992) 216: 84-9					
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	5,711,811	1/27/98	Suntola et al.	118	711	
	5,749,974	5/12/98	Habuka et al.	118	725	
	5,788,447	8/4/98	Yonemitsu et al.	414	217	
	5,851,849	12/22/98	Comizzoli et al.	438	38	
	5,916,365	6/29/99	Sherman	117	92	
	5,935,338	8/10/99	Lei et al.	118	725	
	6,007,330	12/28/99	Gauthier	432	47	
	6,015,590	1/18/00	Suntola et al.	427	255.23	
	6,042,652	3/28/00	Hyun et al.	118	719	
	6,050,216	4/18/00	Szapucki et al.	118	723	
	6,077,775	6/20/00	Stumborg et al.	438	643	
	6,090,442	7/18/00	Klaus et al.	427	255.15	
	6,139,700	10/31/00	Kang et al.	204	192.17	
	6,143,659	11/7/00	Leem	438	688	
	6,270,572	8/7/01	Kim et al.	117	93	
<b>OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)</b>						
	Yarnoff, J. et al., "Atomic Layer Epitaxy of Silicon By Dichlorosilane Studied with Core Level Spectroscopy", J. Vac. Sci. Technol. (1992) A10(4): 2307-7					
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	Sneh, O. and George, S., "Diffusion of Xe on a Stepped It (11, 11, 9) surface", Am. Chem. Soc. Abstracts of Papers (1993) Part 2 (235)					
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<b>OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)</b>			
Koleske, D. et al., "Surface Morphology of Si on Si (100) Grown Below 500 Degrees C Using H/C1 Exchange Chemistry", J. Appl. Phys. (1993) 74(6): 4245-7			
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EXAMINER		DATE CONSIDERED	

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<b>INFORMATION DISCLOSURE CITATION C</b> <b>PTO-1449</b>		ATTY. DOCKET NO. 2344-738	SERIAL NO. 10/052,890
		APPLICANT Sneh	
		FILING DATE 10/19/01	GROUP To Be Assigned
<b>OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)</b>			
	Wise, M.L. et al., "H <sub>2</sub> O Adsorption Kinetics on Si(111) 7x7 and Si(111) 7x7 Modified by Laser Annealing", J. Vac. Sci. Technol. (1995) A13(4): 1853-60		
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	Gorge, S.M. et al., "Surface Chemistry For Atomic Layer Growth", J. Phys. Chem. (1996) 100(31): 13121-31		
	Wise, M.L. et al., "Reaction Kinetics of H <sub>2</sub> O with Chlorinated Si(111)-7x7 and Porous Silicon Surfaces", Surf. Sci. (1996) 364(3): 367-79		
	Ott, A.W. et al., "Surface Chemistry of In <sub>2</sub> O <sub>3</sub> Deposition Using In(CH <sub>3</sub> ) <sub>3</sub> and H <sub>2</sub> O in a Binary Reaction Sequence", Appl. Surf. Sci. (1997) 112: 205-15		
	Ott, A.W. et al., "Al <sub>2</sub> O <sub>3</sub> Thin Film Growth on Si(100) Using Binary Reaction Sequence Chemistry", Thin Solid Films (1997) 292(1-2): 135-144		
	Ott, A. W. et al., "Modification of Porous Alumina Membranes Using Al <sub>2</sub> O <sub>3</sub> Atomic Layer Controlled Deposition", Chem. Of Materials (1997) 9(3): 707-14		
	Klaus, J.W. et al., "Growth of SiO <sub>2</sub> at Room Temperature With the Use of Catalyzed Sequential Half Reactions", Science (1997) 278(5345): 1934-6		
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	Sneh, O. et al., "Atomic Layering Shows Its Metal", European Semiconductor (2000) 22(7): 33-6		
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